

**CLAIMS**

1. (Previously Presented) A gene encoding a protein that catalyzes biosynthesis of at least one member selected from a group consisting of piperitol and sesamin.

2. (Previously Presented) A gene encoding a protein that catalyzes a reaction forming a methylene dioxybridge in at least one member selected from a group consisting of pinoresinol and piperitol.

3. (Previously Presented) The gene encoding a protein according to claim 1, wherein:

the protein includes at least one amino acid sequence selected from a group consisting of:

- (a) amino acid sequences corresponding to SEQ ID NOS: 1, 64 and 78, and
- (b) amino acid sequences that have been modified by at least one of the substitution, deletion, insertion, and addition of one or more amino acids to an amino acid sequence corresponding to SEQ ID NO: 1, 64 and 78.

4. (Previously Presented) The gene encoding a protein according to claim 3, wherein the protein includes an amino acid sequence which is at least 50% homologous to an amino acid sequence selected from a group consisting of SEQ ID NOS: 1, 64 and 78.

5. (Previously Presented) A gene including a base sequence selected from a group consisting of SEQ ID NOS: 2, 65 and 79 as an open reading frame region.

6. (Previously Presented) A protein that catalyzes biosynthesis of at least one of piperitol and sesamin, and hybridizing under stringent conditions with a polynucleotide selected from a group consisting of

(a) polynucleotides including a base sequence corresponding to one of SEQ ID NOS: 2, 65 and 79,

(b) polynucleotides encoding a protein including an amino acid sequence corresponding to one of SEQ ID NOS: 1, 64 and 78, and

(c) fragments thereof.

7. (Previously Presented) The gene according to claim 1, wherein:  
the gene is derived from sesame.

8. (Previously Presented) The protein encoded by a gene according to claim 1.

9. (Previously Presented) A protein that catalyzes biosynthesis of at least one of piperitol and sesamin and includes at least one amino acid sequence selected from a group consisting of

(a) amino acid sequences corresponding to SEQ ID NOS: 1, 64 and 78, and

(b) amino acid sequences that have been modified by at least one of the substitution, deletion, insertion and addition of one or more amino acids to an amino acid sequence corresponding to SEQ ID NOS: 1, 64 and 78.

10. (Previously Presented) An antibody that recognizes a protein according to claim 8.

11. (Previously Presented) A recombinant expression vector including a gene according to claim 1.

12. (Previously Presented) A transformant comprising a recombinant expression vector including a gene according to claim 1.

13. (Previously Presented) A producing method of a protein, comprising:  
producing a transformant according to claim 12; and  
recovering a protein from the transformant that catalyzes biosynthesis of at least one of piperitol and sesamin.

14. (Previously Presented) A transformant according to claim 12, wherein the transformant comprises a plant, its offspring and portions thereof.

15. (Previously Presented) A method of producing at least one of piperitol and sesamin, comprising:  
using a gene according to claim 1 or a protein encoded by such a gene.

16. (Previously Presented) A method of producing a transformant containing an enhanced amount of lignan, comprising:  
using a gene according to claim 1.

17. (Previously Presented) A method of producing a plant containing an enhanced amount of at least one of piperitol and sesamin, comprising:

using a gene according to claim 1.

18. (Previously Presented) A method of producing a transformant containing a reduced amount of lignan, comprising:

using a gene according to claim 1.

19. (Previously Presented) A method of producing a plant containing a reduced amount of at least one of piperitol and sesamin, comprising:

using a gene according to claim 1.

20. (Previously Presented) A method of cultivating sesame, comprising:

using a gene according to claim 1.

21. (Previously Presented) A gene detecting device comprising a polynucleotide probe that incorporates a base sequence selected from a group consisting of base sequences corresponding to the gene according to claim 1 and fractions thereof.